

"Improvements relating to Carton Filling Devices"

This invention is concerned with means for inserting objects being carried on a conveyor into cartons which move along with the conveyor. A standard mechanism for this purpose has a series of pushers which are moved across the conveyor to move objects into the respective cartons, the pushers then being carried around to the start end of the conveyor to locate on to further objects to be inserted. This mechanism has a large number of moving parts (in view of the fact that several independent moving pushers are employed) and occupies a substantial width to one side of the conveyor, for location of the pushers in their extended state.

According to the present invention there is provided a carton filling device comprising a conveyor for moving cartons and objects to be located in the cartons simultaneously down a track with the objects respectively facing opposite to open ends of the cartons located at one side of the conveyor, and a control arm situated in a start position at the other side of the conveyor and carrying pushers for engaging the objects and pushing them towards and into the open ends of the cartons under control of a control mechanism adapted to move the control arm not only across the conveyor, but also down the conveyor at the same speed of movement as the conveyor and to return the control arm back to the start position once the objects have been inserted into the cartons.

With such an arrangement the pushers are moved by means of the control arm essentially diagonally across the track followed by the conveyor and are then brought back, along the same (diagonal) line, to the start position. Pushers  
5 are not carried around with the conveyor as in the previous mechanism.

In the preferred arrangement the pusher arm will carry two to four pushers for engaging respective objects. These pushers are carried by a single control arm of the control  
10 mechanism so that the number of relatively moveable parts is kept to a minimum. Preferably the control mechanism is designed to cause the pusher arm to be raised for the return journey back to the start position. This ensures that there is no fouling with parts of the conveyor or further objects  
15 to be moved. A support body can be situated beside the conveyor to support the control mechanism which controls the movement of the control arm.

The invention may be performed in various ways and a preferred embodiment thereof will now be described, by way  
20 of example, with reference to the accompanying drawings, in which:-

Figure 1 illustrates a carton filling device of this invention at a start position; and

Figures 2 to 4 illustrate sequential operational  
25 positions of the carton filling device in use in inserting objects into cartons.

The device shown in the drawings incorporates a conveyor 1 on which are carried (for example) individual

food trays 2 which are to be inserted into open ended  
cartons 3. As the conveyor 1 moves (from right to left as  
shown in Figure 1) the cartons 3 move at the same speed with  
the conveyor. A robotic support body 4 incorporates a  
5 control mechanism arranged to move the support body about  
suitable rotational axes so as to cause a control arm 5 to  
be moved across the conveyor 1. The arm 5 incorporates  
paddles 6 which engage with the trays 2 so as to push the  
trays towards the cartons 3. The arm 5 is moved across the  
10 conveyor 1, but at the same time moves from right to left at  
the same speed as for the conveyor 1. The diagonal path  
taken by a head 11 of the support body, carrying the arm 5,  
is indicated by the broken line 7 as shown in Figures 2 and  
3. This results in the trays 2 being pushed fully home into  
15 the cartons 3. The arm 5 is then raised and the head 11 is  
brought back along the reciprocal path 8 (as shown in Figure  
4) until the arm returns to and is lowered into the start  
condition as shown in Figure 1. The same operation can then  
be employed to move another set of four trays into a  
20 subsequent series of four cartons.

The paddles 6 could be designed to be disengaged  
appropriately in instances where it is not practical to lad  
the trays into the carton, a monitoring device has sensed  
that there is an oversize product or a badly formed carton.  
25 The robotic arm 10 can be fitted with customised gripper  
attachments to facilitate stacking or tiering of products  
prior to loading the products into the cartons. The paddles  
can incorporate a facility to apply downwards or sideways

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pressure onto the top of the product to ensure that it enters the carton aperture.